



02-24-06

Atty. Dkt. No. 035451-0145 (3682.Palm)

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Applicant: Hanson et al.

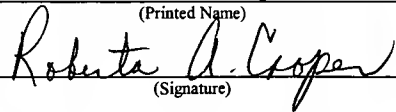
Title: NON-VISIBLE LIGHT DISPLAY  
ILLUMINATION SYSTEM AND  
METHOD

Appl. No.: 09/989,273

Filing Date: 11/20/2001

Examiner: Sawhney, Hargobind S.

Art Unit: 2875

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**TRANSMITTAL**

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P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

Transmitted herewith are the following documents for the above-identified application.

[ X ] Brief On Appeal (26 pages).

[ X ] A Credit Card Payment Form in the amount of \$500.00 for Appeal Fee. The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 06-1447. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 06-1447.

Respectfully submitted,

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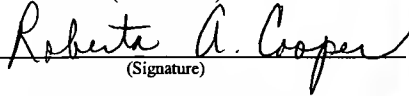
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**BRIEF ON APPEAL**

Mail Stop **APPEAL BRIEF - PATENTS**

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

Under the provisions of 37 C.F.R. § 41.37, this Appeal Brief is being filed together with a credit card payment form in the amount of \$500.00 covering the 37 C.F.R. 41.20(b)(2) appeal fee. If this fee is deemed to be insufficient, authorization is hereby given to charge any deficiency (or credit any balance) to the undersigned deposit account 06-1447.

This paper is being filed in response to the final Office Action dated August 24, 2005 (finally rejecting claims 1-4, 6-19, 22, and 24-27). The Notice of Appeal was filed on December 23, 2005. Appellants respectfully request favorable reconsideration of the application.

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**1. REAL PARTY IN INTEREST**

The real party in interest is the assignee of record, Palm, Inc. (as recorded in the records of the United States Patent and Trademark Office at Reel/Frame 012317/0823 on November 20, 2001).

**2. RELATED APPEALS AND INTERFERENCES**

A Notice of Appeal was previously filed in this application on April 30, 2004. An Appeal Brief was subsequently filed in this application on June 30, 2004. A non-final Office action reopening prosecution of this application was subsequently mailed on September 22, 2004.

There are no other related appeals or interferences that will directly affect, be directly affected by, or have a bearing on the present appeal, that are known to Appellant or Appellant's patent representative.

**3. STATUS OF CLAIMS**

This is an appeal from the final Office Action dated August 24, 2005, finally rejecting claims 1-4, 6-19, 22, and 24-27. Claims 1-4, 6-19, 22, and 24-27 are on appeal.

**4. STATUS OF AMENDMENTS**

Claims 1-4, 6-19, 22, and 24-27 were pending in the application when a final Office Action dated August 24, 2005 was issued. No claims have been amended in the present application subsequent to the receipt of the final Office Action dated August 24, 2005.

**5. SUMMARY OF CLAIMED SUBJECT MATTER**

Independent claim 1 is directed to a lighting system (200) for a display. The lighting system (200) includes a light source (210) providing invisible light having a wavelength in a spectrum not visible to the human eye (211) (see Specification, paragraph [0023]; FIG. 5A). The lighting system (200) also includes a reflective layer (240) having phosphorescent coatings in a

substrate, the phosphorescent coated surface reflecting the invisible light (211) from the light source (210) and converting the invisible light into visible light visible to the human eye (see Specification, paragraph [0023]; FIG. 5A). The lighting system (200) also includes a display layer (230) in which pixels of the display layer (230) may be altered by applying an electrical charge to the display layer (230) in a controlled manner, the display layer (230) being illuminated by the visible light (245) from the reflective layer (240) (see Specification, paragraph [0023]; FIG. 5A). The light source (210) is located below the display layer (230) opposite the side of the display layer (230) viewed by the human eye (see Specification, paragraph [0023]; FIG. 5A).

Independent claim 10 is directed to a method of producing an image on a display. The method includes generating a source of infrared light (110), the light having a wavelength in the infrared spectrum not visible to the human eye (see Specification, paragraph [0016]; FIG. 1). The method also includes distributing the infrared light over the surface of a reflective layer (140), the reflective layer (140) including at least one of a phosphorescent and a fluorescent surface (see Specification, paragraph [0019]; FIG. 1). The method also includes reflecting the infrared light from the light source (110) by the reflective layer (140) (see Specification, paragraph [0019]; FIG. 1). The method also includes converting the infrared light into visible light visible to the human eye by the reflective layer (140) (see Specification, paragraph [0019]; FIG. 1). The method also includes illuminating a display element (130) with the visible light, the display element including individually selectable pixel elements (see Specification, paragraph [0019]; FIG. 1).

Independent claim 17 is directed to a display system (100). The display system (100) includes a light source (110) providing invisible light having a wavelength in a spectrum not visible to the human eye (see Specification, paragraph [0016]; FIG. 1). The display system (100) also includes a light guide (120), dispersing the invisible light over a defined region (see Specification, paragraph [0016]; FIG. 1). The display system (100) also includes a light converter (140), converting the invisible light to light having a wavelength visible to the human eye (see Specification, paragraph [0019]; FIG. 1), the light converter (140) having metallized

coatings (142) on a substrate to reflect visible and invisible light, and the light converter (140) having phosphorescent coatings on the substrate (see Specification, paragraphs [0020], [0022]; FIGS. 1-4). The display system also includes a flexible display layer (130) receiving and transmitting the visible light (see Specification, paragraph [0019]; FIG. 1).

## 6. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The issues on appeal are (1) whether claims 1-2, 4, and 6-9 may properly be rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,982,092 (“Chen”) in view of U.S. Patent No. 4,142,781 (“Baur et al.”); (2) whether claim 3 may properly be rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Baur et al. and further in view of U.S. Patent No. 5,856,819 (“Vossler”); (3) whether claims 10 and 13-16 may properly be rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Vossler; (4) whether claim 11 may properly be rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Vossler and further in view of U.S. Patent No. 4,599,537 (“Yamashita”); (5) whether claim 12 may properly be rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Vossler and further in view of U.S. Patent No. 6,559,918 (“Lueder”); and (6) whether claims 17-19, 22, and 24-27 may properly be rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Baur et al. and further in view of U.S. Patent No. 6,204,902 (“Kim et al.”).

## 7. ARGUMENT

### I. LEGAL STANDARDS

All claim rejections at issue in this appeal are made under 35 U.S.C. § 103(a)<sup>1</sup>. The legal standards under 35 U.S.C. § 103(a) are well-settled.

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<sup>1</sup> “A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.” 35 U.S.C. §103(a).

Obviousness under 35 U.S.C. § 103(a) is a legal conclusion involving four factual inquiries:

- (1) the scope and content of the prior art;
- (2) the differences between the claims and the prior art;
- (3) the level of ordinary skill in the pertinent art; and
- (4) secondary considerations, if any, of non-obviousness.

Litton Systems, Inc. v. Honeywell, Inc., 87 F. 3d 1559, 1567, 39 U.S.P.Q. 2d 1321, 1325 (Fed. Cir. 1996). See also Graham v. John Deere Co., 383 U.S. 1, 148 U.S.P.Q. 459 (1966).

In proceedings before the Patent and Trademark Office (PTO), the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art. In re Piasecki, 745 F.2d 1468, 1471-72, 223 U.S.P.Q. 785, 787-88 (Fed. Cir. 1984). A prima facie case of obviousness requires that the prior art reference or references teaches or suggests all of the claimed limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). “The Examiner can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. In re Fritch, 972 F.2d 1260 (Fed. Cir. 1992); In re Fine, 837 F.2d 1071, 1074 (Fed. Cir. 1988); In re Lalu, 747 F.2d 703, 705, 223 U.S.P.Q. 1257, 1258 (Fed. Cir. 1984); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 297 n.24, 227 U.S.P.Q. 657, 667 n.24 (Fed. Cir. 1985); ACS Hospital Systems, Inc. v. Montefiore Hospital, 782 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984).

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. See W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983). It is improper to combine references where the references teach away from their combination. See In re Grasselli, 713 F.2d 731, 743, 218 U.S.P.Q. 769, 779 (Fed. Cir. 1983). When a reference teaches away from the claimed

invention, that teaching is strong evidence of non-obviousness. See U.S. v. Adams, 383 U.S. 39, 148 U.S.P.Q. 79 (1966); In re Royka, 490 F. 2d 981, 180 U.S.P.Q. 580 (CCPA 1974). If the proposed combination of the references would change the principle of operation of the reference being modified, the teachings of the references are not sufficient to render the claims prima facie obvious. See In re Ratti, 270 F.2d 810, 123 U.S.P.Q. 349 (C.C.P.A. 1959). If proposed modification would render the prior art unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. See In re Gordon, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984). Proceeding contrary to accepted wisdom is evidence of non-obviousness. See In re Hedges, 783 F.2d 1038, 228 U.S.P.Q. 685 (Fed. Cir. 1986).

As noted by the Federal Circuit, the “factual inquiry whether to combine references must be thorough and searching.” McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 60 USPQ.2d 1001 (Fed. Cir. 2001). Further, it “must be based on objective evidence of record.” In re Lee, 277 F.3d 1338, 61 USPQ.2d 1430 (Fed. Cir. 2002). The teaching or suggestion to make the claimed combination must be found in the prior art, and not in the applicant’s disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ.2d 1438 (Fed. Cir. 1991). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ.2d 1430 (Fed. Cir. 1990). “It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to ‘[use] that which the inventor taught against its teacher.’” Lee (citing W.L. Gore v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983)).

## **II. REJECTION OF CLAIMS 1-2, 4, AND 6-9 UNDER 35 U.S.C. § 103(a) BASED ON CHEN IN VIEW OF BAUR ET AL.**

In the final Office Action dated August 24, 2005, the Examiner rejected claims 1-2, 4, and 6-9 under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Baur et al.

The Examiner’s rejection of claims 1-2, 4, and 6-9 under 35 U.S.C. § 103(a) based on the combination of Chen and Baur et al. should be reversed because the Examiner has failed to

establish a prima facie case of obviousness with regard to claims 1-2, 4, and 6-9. A prima facie case of obviousness requires that the prior art reference or references teaches or suggests all of the claimed limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). The combination of Chen and Baur et al. does not teach or suggest at least one element of each of claims 1-2, 4, and 6-9. Accordingly, the Examiner has failed to establish a prima facie case of obviousness, and the rejection of claims 1-2, 4, and 6-9 should be reversed.

Independent claim 1 recites in combination with other limitations “a reflective layer having phosphorescent coatings in a substrate, the phosphorescent coated surface reflecting the invisible light from the light source and converting the invisible light into visible light visible to the human eye.” The cited combination of Chen and Baur et al. does not teach or suggest “a reflective layer having phosphorescent coatings in a substrate, the phosphorescent coated surface reflecting the invisible light from the light source and converting the invisible light into visible light visible to the human eye” as included in the combination of elements of claim 1.

In the final Office Action dated August 24, 2005, the Examiner stated that:

Regarding claim 1, Chen ('092) discloses a lighting system for a display (Figure 3) comprising ... a reflective layer-combination of the fluorescent pigment layer 50 optically in contact with the reflecting layer 30- herein after referred as the reflecting layer 50, 30 (Figure 3, column 3, lines 5-7 and 11-20) ... .  
... the reflective layer 50, 30 reflecting invisible light from the light source 40, and converting invisible light into visible light to human eyes (Figure 3, column 3, lines 5-7 and 11-20).

In response to Appellants' arguments filed on June 8, 2005, the Examiner further stated that “[t]he fluorescent pigment layer 50 has been broadly interrelated as a coating when the layer is in optical contact with the reflection layer 30 (Chen).” In an Advisory Action dated December 7, 2005, the Examiner further stated that:

The phrase “interpose” has been interpreted as the phrase indicating relative positioning of any element. Chen ('092) teaches a relative position of the fluorescent pigment layer, which has been broadly, interpreted as coating – thin layer – . Being in optical



contact with each other, elements 30 and 50 are not considered optically and operationally separate components.

Appellants submit that this is an incorrect characterization of the disclosure of Chen.

There is no teaching or suggestion in Chen that the “fluorescent pigment layer 50” is a “coating.” Moreover, the Examiner has provided no basis or support, either in Chen or otherwise, for the assertion that two layers relatively positioned such that they are functionally in optical contact renders one of the layers a “coating.” In contrast, Chen states that the “fluorescent pigment layer 50 is interposed between the light conductive plate 10 and the light reflection layer 30.” See Chen, column 2, line 67 – column 3, line 1. Thus, the disclosure of Chen suggests that the “fluorescent pigment layer 50” is a separate layer, rather than a coating. That is, the “light reflection layer 30” and the “fluorescent pigment layer 50” are two separate components of the device described in Chen, as opposed to a “phosphorescent coated surface” such as that recited in claim 1.

Moreover, Chen does not teach or suggest a single reflective layer having a “phosphorescent coated surface” that both (1) reflects the invisible light and (2) converts the invisible light into visible light, as required by claim 1. In contrast, Chen discloses a separate “fluorescent pigment layer 50” that “converts the wave length of incident exciting light emitted by the luminescent crystal.” See Chen, column 3, lines 2-3. The light passing through the “fluorescent pigment layer 50” of Chen is then reflected by the “light reflection layer 30.” There is no teaching or suggestion in Chen to provide a single reflection layer that includes a phosphorescent coated surface that both reflects and converts invisible light to visible light. Thus, Chen may not properly be interpreted broadly as teaching or suggesting a “coating,” much less “a reflective layer having phosphorescent coatings in a substrate, the phosphorescent coated surface reflecting the invisible light from the light source and converting the invisible light into visible light visible to the human eye” as included in the combination of elements of claim 1.

As an alternative to the broad characterization of Chen's "fluorescent pigment layer 50," The Office Action further states in response to Appellants' arguments filed on June 8, 2005 that [i]t would have been obvious to one of ordinary skill in the art at the time of the invention to make the fluorescent pigment layer integral with the reflective layer, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together is merely a matter obvious engineering choice, and involves only routine skill in the art." Appellants disagree. Appellants note that the omission of an element and retention of its function is an indicia of unobviousness. In re Edge, 359 F.2d 896, 149 U.S.P.Q. 556 (C.C.P.A. 1966). Here Appellants have effectively removed an element from Chen (e.g., separate layers for converting and reflecting light) and maintained its function.

As to Baur et al., it does not appear to make up for the above-mentioned deficiencies in Chen. Specifically, Baur et al. also fails to teach or suggest "a reflective layer having phosphorescent coatings in a substrate, the phosphorescent coated surface reflecting the invisible light from the light source and converting the invisible light into visible light visible to the human eye" as included in the combination of elements of claim 1. In the Final Office Action dated August 24, 2005, the Examiner stated:

On the other hand, Baur et al. ('781) discloses an electro-optical display device (Figure 9) comprising a fluorescent plate 1a including a phosphorescent coating – a layer 25 containing phosphorescent particles has been broadly interpreted as a coating – (Figure 9, column 9, lines 5-10).

In response to Appellants' arguments filed on June 8, 2005, the Examiner further stated that:

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the lighting system of Chen ('092) by providing the phosphorescent coating as taught by Baur et al. ('781) for the benefits and advantages of amplifying the brightness of the display device, and for providing afterglow of the display after the device is switched off.

As detailed above, Baur et al ('781) teaches that an additional phosphorescent coating applied on a fluorescent plate 1a. Thus,

teaching of Baur et al. ('781) could be provided on the reflective coating of Chen ('092). Further, the motivation for the above-indicated modification includes amplification of brightness of the display device.

Appellants submit, however, that the Examiner is not entitled to this broad interpretation of the "layer 25 containing phosphorescent particles" as a "coating."

There is no teaching or suggestion in Baur et al. that the "layer 25 containing phosphorescent particles" is used as a "coating," much less as a "coating" of a single layer that both reflects invisible light and converts invisible light to visible light. Moreover, the Examiner has provided no basis or support, either in Baur et al. or otherwise, for the assertion that the "layer 25 containing phosphorescent particles" is a "coating." The "layer 25 containing phosphorescent particles" and the "fluorescent plate 1a" appear to be two separate components of the device described in Baur et al., as opposed to a "phosphorescent coated surface" such as that recited in claim 1. Thus, even if the "layer 25 containing phosphorescent particles" taught by Baur et al. were somehow combined with Chen as suggested by the Examiner, the combination of Chen and Baur et al. would still fail to teach or suggest a single "reflective layer having phosphorescent coatings in a substrate, the phosphorescent coated surface reflecting the invisible light from the light source and converting the invisible light into visible light visible to the human eye" as included in the combination of elements of claim 1.

In fact, Baur et al. states that "[b]ehind the fluorescent plate 1a is a layer 25 which contains phosphorescent particles and which has no optical contact with the fluorescent plate 1a." See Baur et al., col. 9, lines 7-10. Thus, Appellants note that even if the Examiner were somehow entitled to an interpretation of the "fluorescent pigment layer 50" in Chen as a "coating" based on its being functionally in optical contact with the "light reflection layer 30," Baur et al. explicitly teaches that the "layer 25 which contains phosphorescent particles" has no optical contact with the fluorescent plate 1a. Accordingly, Baur et al., viewed as a whole, would teach away from combination with Chen. It is improper to combine references where the

references teach away from their combination. See In re Grasselli, 713 F.2d 731, 743, 218 U.S.P.Q. 769, 779 (Fed. Cir. 1983).

Therefore, it is respectfully submitted that the Examiner has failed to establish a prima facie case of obviousness because the combination of Chen and Baur et al. does not teach or suggest at least one element of claim 1, and that and the rejection of claim 1 should be reversed. Furthermore, claims 2, 4, and 6-9 depend from independent claim 1, and therefore the rejection of claims 2, 4, and 6-9 should be reversed for at least the same reasons as discussed above with regard to claim 1. See 35 U.S.C. § 112 ¶ 4.

### **III. REJECTION OF CLAIM 3 UNDER 35 U.S.C. § 103(a) BASED ON CHEN IN VIEW OF BAUR ET AL. AND FURTHER IN VIEW OF VOSSLER**

In the final Office Action dated April 24, 2005, the Examiner rejected claims 3 under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Baur et al. and further in view of Vossler. Claim 3 depends claim 1. As explained above in section 7(II), the combination of Chen in view of Baur et al. fails to render the subject matter of claim 1 prima facie obvious. As to Vossler, it does not appear to make up for the above-mentioned deficiencies in the combination of Chen and Baur et al. Thus, the Examiner's rejection of claim 3 should be reversed for at least the same reasons as discussed above with regard to claim 1. See 35 U.S.C. § 112 ¶ 4.

### **IV. REJECTION OF CLAIMS 10 AND 13-16 UNDER 35 U.S.C. § 103(a) BASED ON CHEN IN VIEW OF VOSSLER**

In the final Office Action dated August 24, 2005, the Examiner rejected claims 10 and 13-16 under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Vossler and further in view of Yamashita. As an initial matter, Appellants note that the Examiner does not appear to actually rely on Yamashita in the rejection of claims 10 and 13-16. The Examiner appears to rely on Yamashita only in the rejection of claim 11, which was rejected separately from claims 10 and 13-16 in the final Office Action dated August 24, 2005. Appellants believe that separate grounds for rejection were intended by the Examiner for claims 10 and 13-16 and for claim 11, with

Yamashita being excluded in the grounds for rejection of claims 10 and 13-16. This is consistent with the Examiner's rejection of claim 12, which does not rely on Yamashita despite the fact that claim 12 depends from claim 10. Accordingly, Appellants do not address Yamashita with regard to claims 10 and 13-16.

The Examiner's rejection of claims 10 and 13-16 under 35 U.S.C. § 103(a) based on the combination of Chen and Vossler should be reversed because the Examiner has failed to establish a prima facie case of obviousness with regard to claims 10 and 13-16. A prima facie case of obviousness requires that the prior art reference or references teaches or suggests all of the claimed limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). The combination of Chen and Vossler does not teach or suggest at least one element of each of claims 10 and 13-16. Accordingly, the Examiner has failed to establish a prima facie case of obviousness, and the rejection of claims 10 and 13-16 should be reversed.

Independent claim 10 recites in combination with other steps "reflecting the infrared light from the light source by the reflective layer" and "converting the infrared light into visible light visible to the human eye by the reflective layer." The cited combination of Chen and Vossler does not teach or suggest "reflecting the infrared light from the light source by the reflective layer" and "converting the infrared light into visible light visible to the human eye by the reflective layer" as included in the combination of steps of claim 10.

In the final Office Action dated August 24, 2005, the Examiner stated that Chen discloses "a reflective layer- combination of the fluorescent pigment layer 50 optically in contact with the reflecting layer 30- herein after referred to as the reflecting layer 50, 30 (Figure 3, column 3, lines 5-7 and 11-20)." Chen, however, does not teach or suggest a single reflective layer that both (1) reflects the infrared light and (2) converts the infrared light into visible light, as required by claim 1. In contrast, Chen discloses a separate "fluorescent pigment layer 50" that "converts the wave length of incident exciting light emitted by the luminescent crystal." See Chen, column 3, lines 2-3. The light passing through the "fluorescent pigment layer 50" of Chen is then reflected by the "light reflection layer 30." There is no teaching or suggestion in Chen to provide a single

reflection layer that both reflects and converts infrared light to visible light. As to Vossler, it does not appear to make up for the above-mentioned deficiencies in the Chen reference regarding the lack of a teaching or suggestion in Chen to provide a single reflection layer that both reflects and converts infrared light to visible light.

Therefore, it is respectfully submitted that the Examiner has failed to establish a prima facie case of obviousness because the combination of Chen and Vossler does not teach or suggest at least one element of claim 10, and that and the rejection of claim 10 should be reversed. Furthermore, claims 13-16 depend from independent claim 10, and therefore the rejection of claims 13-16 should be reversed for at least the same reasons as discussed above with regard to claim 10. See 35 U.S.C. § 112 ¶ 4.

**V. REJECTION OF CLAIM 11 UNDER 35 U.S.C. § 103(a) BASED ON CHEN IN VIEW OF VOSSLER AND FURTHER IN VIEW OF YAMASHITA**

In the final Office Action dated August 24, 2005, the Examiner rejected claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Vossler and further in view of Yamashita. Claim 11 depends claim 10. As explained above in section 7(IV), the combination of Chen in view of Vossler fails to render the subject matter of claim 10 prima facie obvious. As to Yamashita, it does not appear to make up for the above-mentioned deficiencies in the combination of Chen and Vossler. Thus, the Examiner's rejection of claim 11 should be reversed for at least the same reasons as discussed above with regard to claim 10. See 35 U.S.C. § 112 ¶ 4.

**VI. REJECTION OF CLAIM 12 UNDER 35 U.S.C. § 103(a) BASED ON CHEN IN VIEW OF VOSSLER AND FURTHER IN VIEW OF LUEDER**

In the final Office Action dated August 24, 2005, the Examiner rejected claim 12 under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Vossler and further in view of Lueder. Claim 12 depends claim 10. As explained above in section 7(IV), the combination of

Chen in view of Vossler fails to render the subject matter of claim 10 prima facie obvious. As to Lueder, it does not appear to make up for the above-mentioned deficiencies in the combination of Chen and Vossler. Thus, the Examiner's rejection of claim 12 should be reversed for at least the same reasons as discussed above with regard to claim 10. See 35 U.S.C. § 112 ¶ 4.

**VII. REJECTION OF CLAIMS 17-19, 22, AND 24-27 UNDER 35 U.S.C. § 103(a) BASED ON CHEN IN VIEW OF BAUR ET AL. AND FURTHER IN VIEW OF KIM ET AL.**

In the final Office Action dated August 24, 2005, the Examiner rejected claims 17-19, 22, and 24-27 under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Baur et al. and further in view of Kim et al.

The Examiner's rejection of claims 17-19, 22, and 24-27 under 35 U.S.C. § 103(a) based on the combination of Chen, Baur et al., and Kim et al. should be reversed because the Examiner has failed to establish a prima facie case of obviousness with regard to claims 17-19, 22, and 24-27. A prima facie case of obviousness requires that the prior art reference or references teaches or suggests all of the claimed limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). The combination of Chen, Baur et al., and Kim et al. does not teach or suggest at least one element of each of claims 17-19, 22, and 24-27. Accordingly, the Examiner has failed to establish a prima facie case of obviousness, and the rejection of claims 17-19, 22, and 24-27 should be reversed.

Independent claim 17 recites in combination with other limitations "a light converter, converting the invisible light to light having a wavelength visible to the human eye, the light converter having metallized coatings on a substrate to reflect visible and invisible light, and the light converter having phosphorescent coatings on the substrate" The cited combination of Chen in view of Baur et al. and further in view of Kim et al. fails to teach or suggest "a light converter, converting the invisible light to light having a wavelength visible to the human eye, the light converter having metallized coatings on a substrate to reflect visible and invisible light, and the

light converter having phosphorescent coatings on the substrate” as included in the combination of elements of claim 17.

In the final Office Action dated August 24, 2005, the Examiner stated that:

Regarding claim 17, Chen ('092) discloses a lighting system for a display (Figure 3) comprising ... a converter 50,30 – the combination of the reflective layer 30 and the combination of the fluorescent pigment layer 50 optically in contact with the reflecting layer 30- herein after referred as the converter 50, 30 (Figure 3, column 3, lines 5-7 and 11-20) ... .  
... the converter 50,30 converting invisible light from the light source 40 into light visible to human eyes (Figure 3, column 3, lines 5-7 and 11-20).

In the final Office Action dated August 24, 2005, the Examiner stated that “Regarding Claims 17-19, 22, and 24-27, the above indicated responses presented for the Claim 1 are equally applicable.” In the final Office Action dated August 24, 2005, the Examiner stated with regard to claim 1 that:

Regarding claim 1, Chen ('092) discloses a lighting system for a display (Figure 3) comprising ... a reflective layer-combination of the fluorescent pigment layer 50 optically in contact with the reflecting layer 30- herein after referred as the reflecting layer 50, 30 (Figure 3, column 3, lines 5-7 and 11-20) ... .  
... the reflective layer 50, 30 reflecting invisible light from the light source 40, and converting invisible light into visible light to human eyes (Figure 3, column 3, lines 5-7 and 11-20).

In response to Appellants’ arguments filed on June 8, 2005, the Examiner further stated that “[t]he fluorescent pigment layer 50 has been broadly interrelated as a coating when the layer is in optical contact with the reflection layer 30 (Chen).” In an Advisory Action dated December 7, 2005, the Examiner further stated that:

The phrase “interpose” has been interpreted as the phrase indicating relative positioning of any element. Chen ('092) teaches a relative position of the fluorescent pigment layer, which has been broadly, interpreted as coating – thin layer – . Being in optical contact with each other, elements 30 and 50 are not considered optically and operationally separate components.



Appellants submit that this is an incorrect characterization of the disclosure of Chen.

There is no teaching or suggestion in Chen that the “fluorescent pigment layer 50” is a “coating.” Moreover, the Examiner has provided no basis or support, either in Chen or otherwise, for the assertion that two layers relatively positioned such that they are functionally in optical contact renders one of the layers a “coating.” In contrast, Chen states that the “fluorescent pigment layer 50 is interposed between the light conductive plate 10 and the light reflection layer 30.” See Chen, column 2, line 67 – column 3, line 1. Thus, the disclosure of Chen suggests that the “fluorescent pigment layer 50” is a separate layer, rather than a coating. That is, the “light reflection layer 30” and the “fluorescent pigment layer 50” are two separate components of the device described in Chen, as opposed to a “phosphorescent coating” such as that recited in claim 17.

Moreover, Chen does not teach or suggest a single reflective layer having a “phosphorescent coating” and that both (1) reflects the invisible light and (2) converts the invisible light into visible light, as required by claim 17. In contrast, Chen discloses a separate “fluorescent pigment layer 50” that “converts the wave length of incident exciting light emitted by the luminescent crystal.” See Chen, column 3, lines 2-3. The light passing through the “fluorescent pigment layer 50” of Chen is then reflected by the “light reflection layer 30.” There is no teaching or suggestion in Chen to provide a single reflection layer that includes a phosphorescent coating that both reflects and converts invisible light to visible light. Thus, Chen may not properly be interpreted broadly as teaching or suggesting a “coating,” much less “a light converter, converting the invisible light to light having a wavelength visible to the human eye, the light converter having metallized coatings on a substrate to reflect visible and invisible light, and the light converter having phosphorescent coatings on the substrate” as included in the combination of elements of claim 17.

As an alternative to the broad characterization of Chen’s “fluorescent pigment layer 50,” The Office Action further states in response to Appellants’ arguments filed on June 8, 2005 that [i]t would have been obvious to one of ordinary skill in the art at the time of the invention to

make the fluorescent pigment layer integral with the reflective layer, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together is merely a matter obvious engineering choice, and involves only routine skill in the art.”

Appellants disagree. Appellants note that the omission of an element and retention of its function is an indicia of unobviousness. In re Edge, 359 F.2d 896, 149 U.S.P.Q. 556 (C.C.P.A. 1966). Here Appellants have effectively removed an element from Chen (e.g., separate layers for converting and reflecting light) and maintained its function.

As to Baur et al., it does not appear to make up for the above-mentioned deficiencies in Chen. Specifically, Baur et al. also fails to teach or suggest “a light converter, converting the invisible light to light having a wavelength visible to the human eye, the light converter having metallized coatings on a substrate to reflect visible and invisible light, and the light converter having phosphorescent coatings on the substrate” as included in the combination of elements of claim 17. In the Final Office Action dated August 24, 2005, the Examiner stated:

On the other hand, Baur et al. ('781) discloses an electro-optical display device (Figure 9) comprising ... a fluorescent plate 1a, and an additional phosphorescent coating – a layer 25 containing phosphorescent particles – (Figure 9, column 9, lines 5-10).

The Examiner further stated that:

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the lighting system of Chen ('092) by providing the phosphorescent coating as taught by Baur et al. ('781) for the benefits and advantages of amplifying the brightness of the display device, and for providing afterglow of the display after the device is switched off.

In response to Appellants' arguments filed on June 8, 2005, the Examiner further stated with regard to claim 1 (and claim 17) that:

As detailed above, Baur et al ('781) teaches that an additional phosphorescent coating applied on a fluorescent plate 1a. Thus, teaching of Baur et al. ('781) could be provided on the reflective coating of Chen ('092). Further, the motivation for the above-

indicated modification includes amplification of brightness of the display device.

Appellants submit, however, that the Examiner is not entitled to this broad interpretation of the “layer 25 containing phosphorescent particles” as a “coating.”

There is no teaching or suggestion in Baur et al. that the “layer 25 containing phosphorescent particles” is used as a “coating,” much less as a “coating” of a single layer that both reflects invisible light and converts invisible light to visible light. Moreover, the Examiner has provided no basis or support, either in Baur et al. or otherwise, for the assertion that the “layer 25 containing phosphorescent particles” is a “coating.” The “layer 25 containing phosphorescent particles” and the “fluorescent plate 1a” appear to be two separate components of the device described in Baur et al., as opposed to a “phosphorescent coated surface” such as that recited in claim 17. Thus, even if the “layer 25 containing phosphorescent particles” taught by Baur et al. were somehow combined with Chen as suggested by the Examiner, the combination of Chen and Baur et al. would still fail to teach or suggest a single “light converter, converting the invisible light to light having a wavelength visible to the human eye, the light converter having metallized coatings on a substrate to reflect visible and invisible light, and the light converter having phosphorescent coatings on the substrate” as included in the combination of elements of claim 17.

In fact, Baur et al. states that “[b]ehind the fluorescent plate 1a is a layer 25 which contains phosphorescent particles and which has no optical contact with the fluorescent plate 1a.” See Baur et al., col. 9, lines 7-10. Thus, Appellants note that even if the Examiner were somehow entitled to an interpretation of the “fluorescent pigment layer 50” in Chen as a “coating” based on its being functionally in optical contact with the “light reflection layer 30,” Baur et al. explicitly teaches that the “layer 25 which contains phosphorescent particles” has no optical contact with the fluorescent plate 1a. Accordingly, Baur et al., viewed as a whole, would teach away from combination with Chen. It is improper to combine references where the

references teach away from their combination. See In re Grasselli, 713 F.2d 731, 743, 218 U.S.P.Q. 769, 779 (Fed. Cir. 1983).

As to Kim et al., it does not appear to make up for the above-mentioned deficiencies in the Chen and Baur et al. references.

Therefore, it is respectfully submitted that the Examiner has failed to establish a prima facie case of obviousness because the combination of Chen, Baur et al., and Kim et al. does not teach or suggest at least one element of claim 17, and that the rejection of claim 17 should be reversed. Furthermore, claims 18-19, 22, and 24-27 depend from independent claim 17, and therefore the rejection of claims 18-19, 22, and 24-27 should be reversed for at least the same reasons as discussed above with regard to claim 17. See 35 U.S.C. § 112 ¶ 4.

## 8. CONCLUSION

In view of the foregoing, Appellants submit that (1) claims 1-2, 4, and 6-9 are not properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Baur et al.; (2) claim 3 is not properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Baur et al. and further in view of Vossler; (3) claims 10 and 13-16 are not properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Vossler; (4) claim 11 is not properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Vossler and further in view of Yamashita; (5) claim 12 is not properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Vossler and further in view of Lueder; and (6) claims 17-19, 22, and 24-27 are not properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Baur et al. and further in view of Kim et al.

Accordingly, Appellant respectfully requests that the Board reverse all claim rejections and indicate that a notice of allowance respecting all pending claims should be issued.

Respectfully submitted,

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**CLAIMS APPENDIX**

1. A lighting system for a display, comprising:  
  
a light source providing invisible light having a wavelength in a spectrum not visible to the human eye;  
  
a reflective layer having phosphorescent coatings in a substrate, the phosphorescent coated surface reflecting the invisible light from the light source and converting the invisible light into visible light visible to the human eye; and  
  
a display layer in which pixels of the display layer may be altered by applying an electrical charge to the display layer in a controlled manner, the display layer being illuminated by the visible light from the reflective layer,  
  
wherein the light source is located below the display layer opposite the side of the display layer viewed by the human eye.
2. The lighting system of claim 1, wherein the light source includes a light guide.
3. The lighting system of claim 1, wherein the light source provides infrared (IR) light.
4. The lighting system of claim 1, wherein the light source is a single light source.

6. The lighting system of claim 1, wherein the reflective layer includes metallized coatings on a substrate.
7. The lighting system of claim 1, wherein the reflective layer includes fluorescent coatings on a substrate.
8. The lighting system of claim 1, wherein the light source includes a light emitting diode (LED).
9. The lighting system of claim 1, wherein the light source provides at least one of ultraviolet (UV) light and infrared (IR) light.
10. A method of producing an image on a display;  
generating a source of infrared light, the light having a wavelength in the infrared spectrum not visible to the human eye;  
distributing the infrared light over the surface of a reflective layer, the reflective layer including at least one of a phosphorescent and a fluorescent surface;  
reflecting the infrared light from the light source by the reflective layer;  
converting the infrared light into visible light visible to the human eye by the reflective layer; and  
illuminating a display element with the visible light, the display element including individually selectable pixel elements.

11. The method of claim 10, wherein the source of light includes a light emitting diode (LED).
12. The method of claim 10, wherein the display element is a flexible display.
13. The method of claim 10, wherein the source of infrared light is located behind the display element.
14. The method of claim 10, wherein the reflective layer includes a metallized surface.
15. The method of claim 10, wherein the display element is a liquid crystal display element.
16. The method of claim 10, wherein the display element is an electronic paper (e-paper) display element.
17. A display system, comprising:
  - a light source providing invisible light having a wavelength in a spectrum not visible to the human eye;
  - a light guide, dispersing the invisible light over a defined region;
  - a light converter, converting the invisible light to light having a wavelength visible to the human eye, the light converter having metallized coatings on a substrate to reflect visible and invisible light, and the light converter having phosphorescent coatings on the substrate; and



a flexible display layer receiving and transmitting the visible light.

18. The display system of claim 17, wherein the light guide overlays the flexible display layer.

19. The display system of claim 17, wherein the flexible display layer overlays the light guide.

22. The display system of claim 17, wherein the light converter includes fluorescent coatings on a substrate.

24. The display system of claim 17, wherein the light source and light guide combine to form a front lighting system.

25. The display system of claim 17, wherein the light source and light guide combine to form a back lighting system.

26. The display system of claim 17, wherein the light source includes a light emitting diode (LED).

27. The display system of claim 17, wherein the light source provides at least one of ultraviolet (UV) light and infrared (IR) light.

**EVIDENCE APPENDIX**

None

**RELATED PROCEEDINGS APPENDIX**

None